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Proceedings of the Quebec Regional Peer Review on the Assessment of the Gulf of St. Lawrence Greenland Halibut Stock (4RST)

February 26, 2013
Maurice Lamontagne Institute

Chairperson: Serge Gosselin

Rapporteur: Sonia Dubé

Maurice Lamontagne Institute
Fisheries and Oceans Canada
850 Route de la Mer, P.O. Box 1000
Mont-Joli, QC G5H 3Z4

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Foreword

The purpose of these proceedings is to document the key activities and discussions from the meeting. The proceedings may include research recommendations, uncertainties and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the time frame of the meeting. In the rare case when there are formal dissenting views, these are also archived as annexes to the proceedings.

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SUMMARY

This document contains the proceedings from the meeting held within the regional assessment process of the Gulf of St. Lawrence (4RST) Greenland halibut Stock. This review process was held on February 26th, 2013 at the Maurice Lamontagne Institute in Mont-Joli. This meeting gathered more than thirty-five participants from sciences to management to industry. These proceedings contain the essential parts of the presentations and discussions held and relate the recommendations and conclusions that were presented during the review.

SOMMAIRE

Ce document renferme le compte rendu de la réunion tenue dans le cadre du processus régional d'évaluation du stock de flétan du Groenland du golfe du Saint-Laurent (4RST). Cette revue, qui s'est déroulée le 26 février 2013 à l'Institut Maurice-Lamontagne à Mont-Joli, a réuni plus de trente-cinq participants des sciences, de la gestion et de l'industrie. Ce compte rendu contient l'essentiel des présentations et des discussions qui ont eu lieu pendant la réunion et fait état des recommandations et conclusions émises au moment de la revue.

INTRODUCTION

The Quebec Region of the Department of Fisheries and Oceans (DFO) is responsible for assessing the stocks of several exploited fish and invertebrate species in the Estuary and Gulf of St. Lawrence. Most of these stocks are assessed periodically within a regional advisory process, which is conducted at the Maurice Lamontagne Institute in Mont-Joli. This document consists of the proceedings of the meeting held on February 26, 2013, on the assessment of the Gulf of St. Lawrence Greenland Halibut stock (4RST).

The objective of the review was to determine whether there were any changes in the resource's status and whether adjustments to the management plans are required based on the chosen conservation approach, with the ultimate goal being to provide a science advisory report on managing the Greenland Halibut stock in the Gulf of St. Lawrence (4RST) for the 2013 and 2014 fishing seasons.

These proceedings relate the main points discussed in the presentations and deliberations stemming from the activities of the stock assessment regional committee. The regional review is a process open to all participants who are able to provide a critical outlook on the status of the assessed resources. In this regard, participants from outside DFO are invited to take part in the committee's activities within the defined terms of reference for this review (Appendices 1 and 2). The proceedings also relate recommendations made by meeting participants.

CONTEXT

Meeting chairperson Serge Gosselin welcomes participants. He goes over the objectives and agenda of this scientific review. After participants have introduced themselves, the scientists in charge of the review, Brigitte Bernier and Martin Castonguay, highlight collaborator contributions and present the terms of reference as well as the meeting outline.

A few aspects of the biology of the Greenland Halibut (turbot) are presented, as is a portrait of the turbot fishery in 4RST, which consists of 230 fishers, including about 60 in Newfoundland.

- A management representative clarifies that the number of fishers for Newfoundland is actually 96. It is also specified that the minimum size of 44 cm is not a legal minimum size.

Data used for the assessment comes from the commercial fishery and from surveys, namely, the DFO research survey and the mobile gear sentinel fisheries survey. A few details are provided on the calculation of certain indicators (commercial CPUE, size frequencies). Indicator values are interpreted by comparing the average of a given year to the average of a reference period, excluding the last year (1990–2011: DFO survey; 1995–2011: sentinel survey; 1996–2011: commercial fishery), and also to the peak abundance period for the DFO survey (2000–2011).

ASSESSMENT OF THE RESOURCE

COMMERCIAL FISHERY STATISTICS

Mr. Castonguay presents commercial fishery statistics and biological data from the commercial sampling program.

Greenland Halibut landings reached 3,716 t in 2011 and 3,554 t (preliminary as at December 31) in 2012, out of an allocation of 3,751 t. Fishing sites have changed since 2006. The proportion of catches in the western Gulf declined from 68% to 37% between 2007 and 2012, while it increased from 28% to 49% in Esquiman. In 2011 and 2012, catch rates in the Gulf of St. Lawrence were comparable to the historical series average, but lower than those observed between 2007 and 2010. The proportion of individuals under 44 cm in the commercial fishery remained stable at around 7% between 2010 and 2012. The average size increased between 2002 and 2011, from 45.1 cm to 49.5 cm, and remained stable in 2012.

The proportion of females in the fishery decreased and has been below average since 2010. It was 79% in 2011 and 73% in 2012. This decrease is primarily the result of the marked decline in 4R, which went from 72% (2005–2010 mean) to 64% in 2011, ending up at 55% in 2012. The biologist provides three hypotheses to try to explain this decrease: (1) An increase in the average size of males, making them easier to catch; (2) A change in the abundance of females or males > 44 cm in 4R; and (3) The exploitation of new fishing areas with a greater portion of large males.

- Participants agree that we are seeing a change in the fishing pattern, that is, a shift in fishing effort towards the east. It is specified that between 2007 and 2012, there has been less and less fishing carried out in the Estuary, and a fishery has developed around Anticosti (southwest and north). Since 2011, there is no more fishing in southwest Anticosti and there has been a large increase in Esquiman.
- Various reasons are cited to explain this shift in effort: new turbot fishers in 4R; individual quota (IQ) fishery, which would promote fleet displacement; rationalization (licence buy-out); larger turbot in 4R than in 4T; and an abundance of Atlantic Halibut south of Anticosti, which would hinder the directed turbot fishery.
- A decrease in catch rates was observed in the western Gulf as well as in Esquiman in 2012. Management representatives mention that the decrease in Esquiman is related to the quota reconciliation that was applied in 2012.
- Participants are reminded that the effort associated with small boats (< 35 feet) is not reported.
- With respect to the hypothesis of the increase in the average size of males (hypothesis 1) to explain the decrease in the proportion of females in the fishery, it is noted that the average size of females is also increasing, and to a more noticeable extent.
- Participants suggest that the presentation of indices be standardized, for example, by region (e.g., Esquiman, western Gulf) or by NAFO division (4RST).

SURVEY INDICATORS

Ms. Bernier reviews the historical data from the DFO scientific survey and the mobile gear sentinel fisheries survey.

The biomass index from the DFO survey remained stable and above the series mean but has decreased slightly since 2007. The biomass index from the sentinel fisheries survey has been in constant decline since 2007 and was below the mean in 2011 and 2012.

The strong 2004 year class (surrounded by the weak 2003 and 2005 year classes) dominated the fishery in 2011 and 2012 and is contributing to the increase in average catch size. Year classes that should contribute to the fishery in 2013 and 2014 are of average abundance and should maintain the current catch level. The strong 2010 cohort will start being recruited in 2015 and should dominate the fishery in 2016.

The size at which 50% of fish are mature has remained stable and generally below the mean since 2001 at around 36 cm for males and 46 cm for females.

- The hypotheses developed to explain the decline in the proportion of females in the fishery are re-examined. It is specified that the abundance of males and the abundance of females available in the fishery as estimated based on the surveys (hypothesis 2) does not explain the decline in the proportion of females in commercial catches in 4R in 2011 and 2012.
- It is therefore possible that the exploitation of new fishing areas in 4R (hypothesis 3), combined with the greater average size of the males in this area (hypothesis 1) may explain the increase in the proportion of males observed in the fishery in 4R.
- Participants raise the fact that there have always been larger individuals in 4R. Reference is made to various factors that could explain this situation: higher growth rate, more abundant food supply, more favourable environmental conditions, concentration at certain periods. The age structure could differ between the regions. Several studies currently underway could eventually shed some light on the subject.
- Certain participants feel that it would be good to determine the Fulton condition index by region.

IDENTIFICATION OF MONITORING INDICATORS

Indicators that will be monitored for years without assessment are: landings, survey abundance indices and a recruitment index.

- Participants find that, for these monitoring indicators, it is currently difficult to determine thresholds that can be used for deciding on advice reopening in the interim years.
- The Statistical Catch at Length (SCALE) model, which will be presented by Yvan Lambert, may eventually help in the establishment of thresholds.

STATISTICAL CATCH AT LENGTH (SCALE) MODEL AS POTENTIAL GREENLAND HALIBUT POPULATION ASSESSMENT TOOL

Yvan Lambert presents a summary of the research currently underway on the turbot. Then a presentation is given on the exploration of a model that uses size composition (SCALE:

Statistical Catch at Length) as an assessment tool for the Greenland Halibut population in the Gulf of St. Lawrence.

Mr. Lambert presents the information required by the model and how it is obtained and taken into consideration: mean lengths at age by sex, length-weight relationship, recruitment, abundance indices and survey size frequency, total catches and catch size frequencies. A few observations are made.

- With respect to mean lengths at ages 1+ and 2+ (Teleost survey 1990–2012), participants should be able to see a relationship between the curves on the graphs, which is not the case. This may be caused by the fact that the survey does not sample age 1 turbot as well.
- Participants find that the growth curve does not reflect the situation in 4T. They are reminded that this curve is based on the ages present in each region, which may be higher in 4R (Esquiman). Mature individuals may be staying in this region after their migration to spawning grounds.

Among the results obtained, it is noted that the 2004 year class was dominant in the 2011 and 2012 catches. The 2001, 2002, 2006 and 2007 year classes were also well represented in catches during the past two years. Fishing mortality for the exploitable population was F=0.087 and F=0.084 in 2011 and 2012. Estimates by sex indicate that fishing mortality is twice as high in females (F=0.11 and F=0.10) as in males (F=0.06 and F=0.05). The proportion of females in catches for 2011 and 2012 is estimated at 77%.

Total population numbers have been on the decline since 2008, while age 6+ populations (i.e. 44 cm and up) are stable. The total biomass has decreased by 7% since 2010, while the exploitable biomass has been stable at around 51,000 t since 2010. Projections for abundance in biomass and in number for the period from 2013 to 2016 for the fishery's yearly catches, which vary from 3,000 to 5,000 t, indicate decreases in biomass and in numbers in all cases. Decreases in exploitable biomass are around 14 to 22% by 2016, while decreases of around 28 to 31% would be observed for age 6+ populations by 2015.

- It is noted that the adjustment made between size frequencies taken from the mobile-gear sentinel survey and size frequencies predicted by the model is not very good. This may be result of a low catchability of age 2 individuals, which would be underestimated, and/or the fact that this survey does not cover the main nursery located in the Estuary.
- However, participants find that the values used for natural mortality (M=0.3 and M=0.4 for females and males) appear to be accurate, given that the adjustment made between size frequencies predicted by the model and size frequencies taken from the Teleost survey was good.
- Participants are reminded that the two recruitment indices come from the DFO survey.
- It is specified that the fishery in 2012 focused mainly on age 8 turbot, which corresponds to the 2004 cohort.
- The assembly agrees that this quantitative model could eventually be used to develop decision rules and a precautionary approach.

CONCLUSION

SUMMARY

The highlights of the assessment are presented and participants share their comments.

- Certain key points are reformulated to make them more succinct and/or precise. The participants agree not to use abbreviations.
- When referring to the proportion of individuals smaller than 44 cm, it is important to specify that they come from the commercial fishery.
- It is agreed that the size at which 50% of fish are mature has remained stable and generally below the mean since 2001. For the time being, the desire is to simply report these findings, not "sound the alarm."
- Some comments relate to the interpretation of the abundance index from surveys and how to present this highlight. Participants agree that the biomass index from the DFO survey remains stable and above the series mean but has decreased slightly since 2007, while the biomass index from the sentinel fisheries survey has been in constant decline since 2007 and was below the mean in 2011 and 2012.
- Participants deliberate over the main idea they wish to convey with respect to the highlight of the strong 2004 year class. They reformulate it and word it as follows: "The strong 2004 year class (surrounded by weak 2003 and 2005 year classes) dominated the fishery in 2011 and 2012 and is contributing to the increase in average catch size."
- Regarding the year classes that should contribute to the fishery in 2013 and 2014, participants are of the opinion that they should not be as weak. It is agreed that these year classes are of average abundance and should support the current catch level. Furthermore, the strong 2010 cohort will start being recruited in 2015 and should dominate the fishery in 2016.

RECOMMENDATION

Given the values of the indicators of resource status, the status quo is recommended for the catch levels allowed in 2013 and 2014.

APPENDICES

1- PARTICIPANTS LIST

Name	Affiliation
Archambault, Diane	DFO – Science
Autef, Sandra	MERINOV
Ball, Donald	DFO – Fisheries management
Bernier, Brigitte	DFO – Science
Boucher, André	RPPNG, OPFGQ
Bourdages, Hugo	DFO – Science
Brulotte, Sylvie	DFO – Science
Castonguay, Martin	DFO – Science
Chabot, Denis	DFO – Science
Couillard, Catherine	DFO – Science
Courtemanche, David	DFO – Fisheries management
Cyr, Charley	DFO – Science
Denis, Marcel	ACPG
Dallaire, Jean-Paul	DFO – Science
Dubé, Sonia	DFO – Science
Dubé, Steeve	RHMCN
Duplisea, Daniel	DFO – Science
Dupuis, Mario	OPFGQ
Dwyer, Shelley	Department of Fisheries and Aquaculture, Newfoundland and Labrador
Fréchet, Alain	MERINOV (consultant)
Gauthier, Johanne	DFO – Science
Gosselin, Serge	DFO – Science
Grégoire, François	DFO – Science
Hautcoeur, Paul-Guy	Fisher (Quebec)
Hedderson, Carl	Fisher (Newfoundland)
Lambert, Yvan	DFO – Science
Lambert Koizumi, Catherine	AGHAMM
Légaré, Benoît	DFO – Science
Lemelin, Dario	DFO – Fisheries management
Lévesque, Jean-Guy	RPPNG
Maltais, Domynick	DFO – Science
Michaud, Marie-Claire	DFO – Fisheries management
Robert, Dominique	CFER – Memorial University
Savenkoft, Claude	DFO – Science
Schwab, Philippe	DFO – Science
Spingle, Jason	FFAW - CAW
Vallée, Daniel	ACPG

2- TERMS OF REFERENCE

ASSESSMENT OF THE GULF OF ST. LAWRENCE (4RST) GREENLAND HALIBUT

Regional Peer Review - Quebec Region

February 26, 2013
Mont-Joli, Québec

Chairperson: Serge Gosselin

Context

The Gulf of St. Lawrence (4RST) Greenland halibut (also called black turbot, or more commonly turbot) fishery developed at the end of the 1970s. Since 1982, the Greenland halibut fishery has been managed by controlling total allowable catches (TAC). This TAC management helps limit exploitation in order to protect the population's reproductive potential. Over the years, Fisheries and Oceans Canada (DFO) has implemented other conservation measures that have helped reduce the number of immature fish caught. However, minimum biomass and maximum exploitation rates that could jeopardize the resource are unknown. Also unknown is the optimal exploitation rate which could help set precise targets.

Greenland halibut population assessment is done every two years in order to highlight changes in the status of the resource that would justify adjustments to the conservation measures and management plan.

Objectives

Provide scientific advice on Greenland halibut stock status to determine the TAC in NAFO Divisions 4RST for the 2013 and 2014 fishing season. This advice shall include:

- Conclusions of an assessment of the Greenland halibut stock based on:
  - commercial fishery statistics following the 2011 and 2012 fishing seasons (overall landing distribution, breakdown by division and fishing gear, yields and catch rates) and biological data resulting from the commercial sampling program (size structure);
  - historical data from the DFO research survey up to 2012 (abundance index, biomass, recruitment, size structure and geographical distribution of catches);
  - historical data of the July mobile sentinel survey up to 2012 (abundance index, biomass, size structure and geographical distribution of catches);
  - trends of abundance index and other available stock indicators (fishery, biology, etc.).
- Specific elements concerning the development of a scientific advice, such as:
  - an update of the condition and maturity indicators;
- The identification and priorization of research projects to be considered for the future;
- The determination of indicator thresholds for the Scientific advice reopening for years without stock assessment;
- Use of the Statistical Catch at Length (SCALE) model as a potential tool for assessing the Greenland halibut population;

- Detailed analysis of catches in recent years to examine changes in fishing effort;
- Perspectives for 2013 and 2014 based on available indicators.

Expected Publications

- Canadian Science Advisory Secretariat (CSAS) Science Advisory Report on Greenland halibut in the Gulf of St. Lawrence (4RST);
- CSAS Proceedings summarizing the discussion.

Participation

- DFO Science and Fisheries Management
- Fishing industry
- Provincial representatives
- Aboriginal Communities / Organizations